IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF: :
MATSUDA ET AL. : EXAMINER: CHRISTOPHER D. RODEE
SERIAL NO.: 10/086,683 :
FILED: MARCH 4, 2002 : GROUP ART UNIT: 1756

FOR: CARRIER FOR DEVELOPER FOR DEVELOPING ELECTROSTATIC LATENT IMAGE, IMAGE FORMING METHOD USING SAME AND IMAGE FORMING APPARATUS USING SAME

DECLARATION UNDER 37 CFR 1.132

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

Now comes **Hiroaki Matsuda** who deposes and states:

1. That I am a graduate of Tokyo University of Science, and received a Master degree in Science in the year of 1991.

2. That I have been employed by Ricoh Company Limited for 11 years as a researcher of Chemistry, and for 4 years as a member of Intellectual Property Department, Legal Division.

3. That I am a co-inventor in the above-identified application.

4. That I have read and understood Matsuda et al. (JP2001-027829), Yuasa et al. (WO00/52533 or US 6,579,653), *Handbook of Imaging Materials*, Shintani et al. (US 5,204,204),which have been cited against the claims in the above-identified application.

5. That none of the aforementioned cited references do not disclose a carrier which comprises core particles having a weight average particle diameter of 48 to 50 μm.

6. That the following additional experiment was conducted under my supervision during the period of from January 11, 2000 to March 10, 2000.

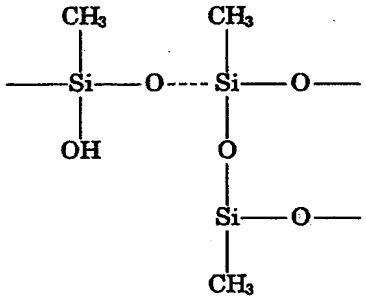
Experiment:

Carrier E and Carrier F were prepared in a manner described in the Examples of the present specification, provided that a weigh average particle diameter of core particles are adjusted to be outside the range defined in the present invention, i.e., outside the range of 48 to 50 μm.

<Preparation of Coating Liquid (a) for Carrier>

The coating liquid (a) for carrier was prepared in the same manner as Coating Liquid (I) of Example 1 in the present specification.

Namely, 600 parts by weight of dimethylsilicone resin having constituting units of the formula (1) below (toluene solution, solid matter of 20% by weigh), 600 parts by weight of toluene, 9.7 parts by weight of γ-aminotriethoxysilane (KBE903, manufactured by Shin-Etsu Chemical Co., Ltd.), and 10.2 parts by weight of carbon black (BP-2000, manufactured by Cabot Company Ltd.) were mixed and thoroughly dispersed with a homomixer (jacket temperature: 35-40°C.) for 20 minutes to thereby obtain Coating Liquid (a).



Formula (1)

<Preparation of Carrier E>

Carrier core material E below	5000 parts by weight
Coating Liquid (a)	1220 parts by weight
Tin catalyst $(C_3H_7)_2Sn(OCOCH_3)_2$ (10% toluene solution)	16.8 parts by weight

The above carrier core material E was coated with the above coating liquid (a) by means of a coating device which performed a coating while rotating a rotary bottom disc in a fluidized bet to form a vortex. The temperature within the coating device was set to 70°C. The coated carrier was then heated at 300°C. for 2 hours in an electric oven to thereby yield Carrier E. Carrier E had a specific resistance of $3.3\times10^{12}\Omega\cdot$cm.

The aforementioned carrier core material E had a weight average particle diameter of 42 μm, saturation magnetization of 48 emu/g, residual magnetization of 50 G, a coercive force of 20 Oe, an apparent density of 2.49 g/cc, and fluidity of 25.8 sec/50 g.

<Preparation of Carrier F>

Carrier core material F below	5000 parts by weight
Coating Liquid (a)	1220 parts by weight
Tin catalyst $(C_3H_7)_2Sn(OCOCH_3)_2$ (10% toluene solution)	16.8 parts by weight

The above carrier core material F was coated with the above a coating liquid (a) by means of a coating device which performed coating while rotating a rotary bottom disc in a fluidized bet to form a vortex. The temperature within the coating device was set to 70°C. The coated carrier was then heated at 300°C. for 2 hours in an electric oven to thereby yield Carrier F. Carrier F had a specific resistance of $1.2\times10^{14}\Omega\cdot$cm.

The aforementioned carrier core material F had a weight average particle diameter of 61 μm, saturation magnetization of 93 emu/g, residual magnetization of 90 G, a coercive force of 12 Oe, an apparent density of 2.60 g/cc, and fluidity of 24.8 sec/50 g.

Evaluations:

The thus obtained Carriers E and F were evaluated in the same manner as in Examples 1 and 2 of the present specification. The results are shown in the following table 1. As comparisons, the results of Examples 1 and 2 of the present specification are also shown in the table.

Table 1

	Number average particle diameter of carbon (μm)	Specific resistance of carrier (Ω·cm)	image density	Rank of reproducibility of fine line image	others
Carrier E	0.04	3.3×10^{12}	1.58	2	large amount of carrier deposition
Carrier F	0.04	1.2×10^{14}	0.98	3	edge effect
Ex. 1	0.04	2.0×10^{13}	1.41	4	no problem
Ex, 2	0.04	1.5×10^{13}	1.45	5	no problem

Results:

As shown in Table 1, Carriers E and F, each of which has core particles having a volume average particle diameter of outside the range of 48 to 50 μm, have inferior properties to Examples 1 and 2 each of which has core particles having a volume average particle diameter of 48 to 50 μm.

Conclusion:

As evidenced above, the carrier of the present invention, i.e., the carrier comprising core particles having a weight average particle diameter of 48 to 50 μm, and a resin layer comprising a crosslinked silicone resin which the resin layer covers each of the core particles and comprises carbon particles having a number average particle diameter of 0.01 to 0.1 μm, has a significant technical effect to compared with a carrier having a weight average particle diameter of outside the range of 48 to 50 μm.

Namely, the technical features of the present invention are attained by all conditions of the present invention are satisfied.

7. The undersigned petitioner declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.

8. Further deponent saith not.

Hiroaki Matsuda

Hiroaki Matsuda

August 31 2005

Date